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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,791	09/19/2005	Tomomi Katoh	2271/75134	7893

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COOPER & DUNHAM, LLP
1185 AVENUE OF THE AMERICAS
NEW YORK, NY 10036

EXAMINER	
LEBRON, JANNELLE M	

ART UNIT	PAPER NUMBER
2861	

MAIL DATE	DELIVERY MODE
06/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/549,791	KATOH, TOMOMI	
	Examiner	Art Unit	
	Jannelle M. Lebron	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/19/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Kusunoki et al. (WO 03/026897).

Kusunoki et al. discloses an image reproducing and forming apparatus

- Claim 1:

comprising:

an ejection head (ink jet head 14) configured to eject a liquid droplet from a nozzle to form an image on a medium;

a driving signal generating unit (circuit 77; page 24, line 16 through page 25, line 3) configured to generate a driving signal having a waveform that causes the ejection head to operate at a driving frequency other than the natural frequency of the ejection head (page 34, line 13 through page 35, line 14; as seen in figs. 13 and 14); and

a driving unit (head driving unit 71) configured to drive the ejection head based on the driving signal supplied from the driving signal generating unit (page 24, line 16 through page 25, line 3).

- Claim 2:

wherein the driving signal generating unit produces the driving signal including a non-ejecting pulse that produces energy for not ejecting the droplet, and the driving unit applies the non-ejecting pulse to the ejection head in a non-printing range in order to drive the ejection head at the driving frequency other than the natural frequency of the ejection head (as seen in fig. 16; page 37, lines 8-16).

- Claim 3:

wherein the driving signal generating unit produces the non-ejecting pulse, making use of a portion of an ejecting pulse of the driving signal (as seen in fig. 15a; page 37, lines 8-12).

- Claim 4:

wherein the driving signal generating unit produces the non-ejecting pulse that draws in a meniscus of the nozzle (page 28, lines 5-8).

- Claim 5:

wherein the driving signal generating unit produces the non-ejecting pulse that pushes out a meniscus of the nozzle and has a pulse width smaller than a period of pressure-induced resonance in a liquid chamber of the ejection head (so that the droplet is not ejected).

- Claim 6:

wherein the non-ejecting pulse has a falling edge with a first rate of voltage change and a rising edge with a second rate of voltage change that is smaller than the first rate of voltage change (page 39, line 25 through page 41, line 2).

- Claim 7:

wherein the non-ejecting pulse includes a first portion that draws in a meniscus of the nozzle with a first rate of voltage change and a second portion that restores the meniscus of the nozzle with a second rate of voltage change smaller than the first rate of voltage change (as seen in fig. 10; page 27, line 19 through page 28, line 13).

- Claim 8:

wherein the non-ejecting pulse includes a first waveform that pushes out a meniscus of the nozzle and a second waveform that follows the first waveform to draw in the meniscus of the nozzle, the first waveform having a pulse width smaller than a resonant frequency of a liquid chamber of the ejection head (page 34, lines 1-9).

- Claim 9:

wherein the driving signal includes a first non-ejecting signal inserted at a beginning of the driving signal (holding signal b; page 28, line 2 through page 29, line 23) and a second non-ejecting signal inserted at an end of the driving signal (as seen in fig. 15a).

- Claim 10:

wherein the ejection head includes an actuator (piezoelectric vibrator 52) for producing a pressure to eject the droplet, and the driving signal including the non-ejecting pulse is applied to the actuator (page 22, lines 6-19).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

4. Hasenbein et al. (US 2005/0200640) discloses a method for driving a droplet ejection device having an actuator, including applying a multipulse waveform that includes two or more drive pulses to the actuator to cause the droplet ejection device to eject a single droplet of a fluid, wherein a frequency of the drive pulses is greater than a natural frequency of the droplet ejection device.

5. Hosono et al. (US Patent 6,598,950) discloses a recording head provided with a pressure chamber communicated with a nozzle orifice from which an ink droplet is ejected, and a vibration plate deformed by a pressure generating element to vary a volume of a pressure chamber that is driven such that it is contracted so as to such a meniscus of ink from a nozzle orifice such an extent that an ink drop is not ejected therefrom. Then the pressure chamber is expanded so as to pull the pushed-out meniscus toward the pressure chamber and then contracted and held in the contracted state to eject an ink droplet from the nozzle orifice.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571)

272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jannelle M. Lebrón
AU 2861
06/04/2007

MATTHEW LUU
SUPERVISORY PATENT EXAMINER